

To sum up shortly the result of this induction. It seems fairly proved that *Mya arenaria*, one of the very commonest shells in the present seas of Scandinavia, Britain, and Belgium, where the conditions are singularly favourable for it, has only recently invaded those shores. Secondly, that it is not an Arctic shell as has been supposed, but a boreal one. It has not been found living in Arctic waters, and its alleged occurrence there has been due to a mistaken inference. Hence, all deductions as to glacial climate deduced from its having occurred in certain beds must fall to the ground. It may well be, as Brögger suggests, that when it recently invaded the European seas it came from North America. On the other hand, the same shell existed abundantly in Britain in the times of the Middle and Later Crag, and has been found in Scandinavia at Uddevalla, affording some evidence that a portion at all events of the Uddevalla shell-beds are what is called pre-glacial or late Crag. So that the mollusc must have died out for a considerable time or been exterminated. Meanwhile it becomes a very good test to discriminate between the shells of the Crag and those derived from it, on the one hand, and the subsequent fauna of the raised beaches etc., down to recent times, on the other. The cause of its extinction and the explanation of its reintroduction, unless the latter was due to human agency, are equally puzzling. The notion that *Mya arenaria* was the victim of that *Deus ex machina*, the Ice Age, is excluded by the fact that the companions of this shell in our modern estuaries suffered no such extinction, but survived all through the period from the Crag age until our own day.

2. The Asiatic Fishes of the Family Anabantidæ.

By C. TATE REGAN, M.A., F.Z.S.*

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(Plates LXXVII.-LXXIX.†)

In my classification of the Teleostean Fishes (Ann. Mag. N. H. (8) iii. 1909, pp. 75-86), the Anabantoidei are placed as a sub-order of the order Labyrinthici, which includes also the Ophiocephaloidei.

The Labyrinthici form a terminal group which has attained a considerable degree of specialization; they are physoclistic, the parietal bones are separated by the supraoccipital, there is no orbitosphenoid, the protractile præmaxillaries exclude the toothless maxillaries from the oral border, there is no mesocoracoid, the vertebral centra are solid and coossified with the arches, and the pelvic fins are placed well forward. Characteristic is the presence on each side of a supra-branchial cavity which contains a laminar

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† For explanation of the Plates see p. 787.

expansion or process of the first epibranchial; also the continuation backwards of the abdominal cavity, supported by ribs, nearly to the caudal fin, this caudal extension containing only the posterior part of the air-bladder. Another feature of some importance is the presence of teeth on the parasphenoid, between and just in front of the upper pharyngeals; in some genera these teeth form quite a well-marked patch, in others they are less prominent; in the very aberrant *Luciocephalus* I find only two or three minute teeth on the parasphenoid. The cranium of all the Labyrinthici is remarkably solid, the nasals are firmly united by suture to the frontals, the præorbitals to the præfrontals, and the postorbitals to the frontals and post-frontals; the suborbital ring is fixed and rigid; the supra-branchial cavities hollow out the otic region; as a rule they are bordered above by the laminar supra-temporal (ptertotic) and opisthotic, and within mainly by the exoccipitals, but in *Ophiocephalus* they reach the parietals, and in *Anabas* the supraoccipital and post-frontals also take part in roofing the suprabranchial cavities, which are only separated from each other in this type by a thin median septum, the cranial cavity being pushed forward. The post-temporal is forked, attached to the epiotic above and the opisthotic below; the ribs are inserted on strong transverse processes.

The Ophiocephaloidei are undoubtedly the most primitive sub-order; in them all the fin-rays are articulated and the 6-rayed pelvic fins are subabdominal in position, the pelvic bones being remote from the cleithra. The suprabranchial organ is not labyrinthic and the long simple air-bladder extends back for the whole length of the anal fin, the basalia of the latter being attached not to hæmal spines, but to the distal ends of the ribs.

In the Anabantoidei the pelvic fins are composed of a spine and five or fewer soft rays or may be reduced to a single filamentous ray, and the pelvic bones are attached to the ligament which connects the cleithra above their symphysis, either loosely or more or less firmly. The suprabranchial lamina is often branched and convoluted and the air-bladder is divided posteriorly by the hæmal spines which support the basalia of the anal fin.

The Ophiocephaloidei probably originated from fishes very similar to the Cyprinodontidæ, which like them are soft-rayed fishes with 6-rayed pelvic fins and with a scaly head, and which resemble them in the structure of the mouth and in many details of the cranium, vertebral column, and pectoral arch.

I follow Bleeker and Günther in recognizing two families of the Anabantoidei, viz. Anabantidæ, with the mouth moderately protractile and the gill-openings restricted by the broad union of the scaly gill-membranes, and Luciocephalidæ, with the mouth very protractile and the gill-openings wide, the naked gill-membranes not being united.

The Labyrinthici inhabit the Ethiopian and Oriental Regions, but two species, *Anabas scandens* and *Ophiocephalus striatus*, cross

Wallace's Line into Celebes, Amboina, and Halmahera*. As a group they are remarkable for the time they can live out of water and for their habit of migrating overland from one pond or stream to another. One species, *Anabas scandens*, is said habitually to climb trees.

Family ANABANTIDÆ.

Synopsis of the Asiatic Genera.

- I. Each pelvic fin of a spine and 5 soft rays.
 - A. First soft ray of pelvic fin bifid; two lateral lines, the lower commencing below the end of the upper and separated from it by a series of scales; dorsal spines numerous.
 1. Jaws with fixed conical teeth.
- Vomerine teeth; pelvic fins inserted a little behind the base of the pectorals 1. *Anabas*.
- Palate toothless; pelvic fins inserted below the base of the pectorals 2. *Polyacanthus*.
2. Jaws with small movable teeth attached to the thick lips 3. *Helostoma*.
- B. First soft ray of pelvic fin produced into a single filament.
 1. Lateral line present, complete and continuous ... 4. *Osphromenus*.
 2. Lateral line vestigial or absent.
- D. XIII-XVII 5-8. A. XVI-XX 9-15; præorbital serrated; dorsal and anal scaly at the base 5. *Macropodus*.
- D. XIII 7. A. XIII 9; præorbital entire; dorsal and anal scaleless 6. *Parosphromenus*.
- D. VIII-XII 7-10. A. VIII-X 18-22; præorbital and lower limb of præoperculum serrated; origin of dorsal over spinous part of anal 7. *Sphærichthys*.
- D. II-VI 6-8. A. IV-VIII 24-28; præorbital and præoperculum serrated; origin of dorsal over soft part of anal 8. *Ctenops*.
- D. I 7-10. A. IV 20-37; præorbital and præoperculum entire 9. *Betta*.
- II. Each pelvic fin of a vestigial spine adnate to a long filamentous ray, which has 2 or 3 small branched rays in its axil 10. *Trichopodus*.
- III. Each pelvic fin reduced to a single long filamentous ray 11. *Trichogaster*.

* All available evidence is strongly against the supposition that these three islands have been connected with each other and with Borneo or the Philippines during the life-time of these two species. Both are common and widely distributed fishes, much appreciated as food, and are so easily kept alive that the natives carry them about in jars, either with or without water, in order to have a supply of fresh fish ready. Thus nothing is more likely than that both species were introduced into Celebes, Amboina, and Halmahera by man; once introduced their peculiar powers of migration would soon enable them to spread all over these islands. These remarks apply also to *Monopterus javanensis*, another Indian species found in Celebes, an important food-fish able to live for a long time out of the water, which is kept alive in jars by the natives of the countries in which it occurs.

An Indian Symbranchoid eel, *Symbranchus bengalensis*, is known not only from Celebes but from Western Australia; this is essentially a brackish-water fish and there can be little doubt it sometimes descends to the sea.

An endemic Cyprinodont, *Haplochilus celebensis*, is the only remaining fish which has been supposed to indicate the Indian affinities of the freshwater fish fauna

1. ANABAS.

Anabas, Cuv. Règne Anim. ii. p. 310 (1817); Günth. Cat. Fish. iii. p. 374 (1861); Bleek. Verh. Akad. Amst. xix. 1879, p. 4.

Body oblong, subcylindrical anteriorly and compressed posteriorly. Small fixed conical teeth in the jaws and on the vomer. Præorbital, operculum, sub- and inter-operculum serrated. Dorsal with XVI-XIX 7-11 rays; origin in advance of that of the anal, which has IX-XI 8-12 rays; soft dorsal and anal scaly at the base and with the rays branched. Pelvics inserted a little behind the pectorals, of a spine and 5 branched rays; first branched ray only bifid. Scales large, regularly arranged; lateral line interrupted below the posterior part of the spinous dorsal, commencing again lower down.

The African genus *Spirobranchus* appears to me to be well distinguished from *Anabas* by the strongly compressed head and body, the presence of teeth on the palatines, the exposed maxillary, the entire præorbital and opercular bones, and the fewer fin-spines. *Ctenopoma* is much nearer to *Anabas*, but the Asiatic genus is well distinguished from both the African ones in that the postorbitals are large plates which cover the cheeks and are united by suture with the præoperculum, whilst the supra-branchial cavities are so large that they are roofed in by the parietals and supraoccipital and are only separated from each other by a thin septum formed by the supraoccipital and exoccipitals.

A single species from India, the Malay Peninsula and Archipelago.

of Celebes, but as it belongs to a family and a genus which includes many marine forms it has little significance.

To illustrate the geographical distribution of freshwater fishes a primary division must be made separating the Australian Region, including Celebes, from the rest of the world. With the exception of (1) archaic types, *Ceratodus* and *Scleropages*, and (2) introduced species, such as *Anabas scandens*, the freshwater fishes of the Australian region belong to marine families, genera, or species. Ostariophysi are entirely absent except Siluroids of the marine groups Plotosidæ and Arinæ; the perches are Serranidæ, Kuhlidiæ, etc.; peculiar genera and species of Atherinidæ, Mugilidæ, Gobiidæ, etc., form an important element in the freshwater fish fauna. The contrast between Borneo with its hundreds of species of Cyprinoids and freshwater Siluroids, Ophiocephalidæ, Anabantidæ, Luciocephalidæ, Nandidæ, and Mastacembelidæ, and Celebes from which these groups are entirely absent except for two species which cannot be regarded as indigenous, is most striking. The conclusion is that Wallace's Line indicates where the severance of Australia from Asia took place not later than the beginning of the Eocene.

I have been led to make these remarks by Prof. Max Weber's conclusion that the fish-fauna of Celebes has no Australian, but an impoverished Indian character (Zool. Ergebn. Reis. Ned. Ind. iii. 1894, p. 472). As I have shown above, the Indian element consists of three species which have probably been introduced by man and two which may have journeyed by sea. Prof. Max Weber also lays stress on the absence from Celebes of true Australian freshwater fishes, but I am unable to recognize this element in Australia itself; the Dipneusti and Osteoglossidæ, which are also absent from New Guinea, but one of which is represented in Borneo, are to be regarded, wherever they may occur, as survivals of an ancient fauna. Of the other genera mentioned by Prof. Max Weber, *Galaxias* is southern and marine, and is not found within a thousand miles of Celebes, whilst *Oligorus* is a perch found in the rivers of Eastern Australia, and belongs to the marine family Serranidæ.

1. ANABAS SCANDENS.

Perca scandens Daldorff, Trans. Linn. Soc. iii. 1797, p. 62.

Anthias testudineus Bloch, Ausl. Fisch. vi. p. 121, pl. cccxxii. (1795).

Amphiprion testudineus Schneid. Bloch's Syst. Ichth. p. 204 (1801).

Amphiprion scansor Schneid. t. c. p. 570.

Lutianus testudo Lacep. Hist. Nat. Poiss. iv. p. 235 (1803).

Lutianus scandens Lacep. t. c. p. 239.

Sparus testudineus Shaw, Zool. iv. p. 471 (1803).

Sparus scandens Shaw, t. c. p. 475.

Cojus cobojus Buch. Ham. Fish. Ganges, pp. 98, 370, pl. xiii. fig. 33 (1822).

Anabas testudineus Cuv. Règne Anim. ii. p. 310 (1817); Bleek. Atl. Ichth. pl. cccxcvi. figs. 2, 3 (1878), and Verh. Akad. Amst. xix. 1879, p. 7.

Anabas scandens Cuv. & Val. Hist. Nat. Poiss. vii. p. 249, pl. exciii. (1831); Günth. Cat. Fish. iii. p. 375 (1861); Day, Fish. Ind. p. 370, pl. lxxviii. fig. 3 (1878).

Anabas spinosus Gray, Ill. Ind. Zool. ii. pl. lxxxix. fig. 1 (1834).

Anabas variegatus Bleek. Nat. Tijdschr. Ned. Ind. ii. 1851, p. 220.

Anabas macrocephalus Bleek. Nat. Tijdschr. Ned. Ind. vii. 1854, p. 430; Günth. t. c. p. 376.

Anabas oligolepis Bleek. Nat. Tijdschr. Ned. Ind. viii. 1855, p. 161; Atl. Ichth. pl. cccxcv. fig. 5 (1878), and Verh. Akad. Amst. xix. 1879, p. 5; Günth. l. c.

Anabas microcephalus Bleek. Act. Soc. Sci. Ind. Neerl. ii. 1857, No. 7, p. 58; Atl. Ichth. pl. cccxcv. fig. 2, and Verh. Akad. Amst. xix. 1879, p. 10; Günth. t. c. p. 377.

Anabas trifoliatus Kaup, Arch. f. Nat. 1860, p. 124, pl. vi. fig. A.

Dorsal with XVI–XIX 7–11 rays; anal with IX–XI 8–12. 27 to 32 scales in a longitudinal series. Greenish olive; usually two dark stripes from the eye to the opercles; sides of the body sometimes with dark cross-bands, sometimes with longitudinal stripes; often a blackish spot, which may be ocellated, at the base of the caudal fin; markings disappearing with age, the adults uniform or nearly so.

Hab. India; Ceylon; Malay Peninsula and Archipelago, to the Philippines, Celebes, Amboina, and Halmahera.

Günther in 1861 recognized four species, *A. scandens*, *macrocephalus*, *oligolepis*, and *microcephalus*. Bleeker in 1879 united *macrocephalus* with *scandens* and expressed doubt as to the validity of *microcephalus*. These three supposed species were based only on differences in form and proportions, but *A. oligolepis* was said to differ in the fewer scales, 27 instead of 30 to 32. Day (Fish. India, p. 370) gave it as his opinion that a regular gradation existed between these numbers. I find the number of scales varies considerably, but I am unable to recognize more than one species after examination of a large series of specimens.

2. POLYACANTHUS.

Polyacanthus (part.) Cuv. & Val. Hist. Nat. Poiss. vii. p. 353 (1831); Günth. Cat. Fish. iii. p. 378 (1861).

Polyacanthus Bleek. Verh. Ak. Amst. xix. 1879, p. 12.

Body oblong, compressed. Jaws with fixed conical teeth; palate toothless. Præoperculum serrated. Dorsal with XIV-XIX 8-11 rays; origin in advance of that of the anal, which has XIV-XVII 10-13 rays; soft dorsal and anal scaly at the base and with the rays branched. Pelvics inserted below the pectorals, of a spine and 5 branched rays, the first of which is produced into two filaments. Scales large, regularly arranged; lateral line interrupted below the posterior part of the spinous dorsal, commencing again lower down.

Two species from Ceylon and the Malay Archipelago.

1. POLYACANTHUS HASSELTII.

Polyacanthus hasseltii Cuv. & Val. Hist. Nat. Poiss. vii. p. 353, pls. cxcv., ccv. (1831); Günth. Cat. Fish. iii. p. 378 (1861); Bleek. Atl. Ichth. pl. ccxcvi. fig. 7 (1878) and Verh. Ak. Amst. xix. 1879, p. 12.

Polyacanthus kuhlii Bleek. Nat. Gen. Arch. Ned. Ind. ii. 1845, p. 520.

Polyacanthus einthovenii Bleek. Nat. Tijdschr. Ned. Ind. ii. 1851, p. 423; Günth. l. c.

Polyacanthus helfrichii Bleek. Nat. Tijdschr. Ned. Ind. viii. 1855, p. 162; Günth. t. c. p. 379.

Præorbital not serrated; maxillary extending to the vertical from between the nostrils; interorbital width more than $\frac{1}{3}$ the length of head. Dorsal XVI-XIX 10-13. Anal XV-XVII 11-13. 31 to 33 scales in a longitudinal series. Olivaceous; young with darker cross-bars; sometimes a blackish spot at the base of the soft dorsal; soft vertical fins sometimes with series of small dark spots or with reticulating lines.

Hab. Java, Sumatra, and Borneo.

A single specimen, 160 mm. in total length.

2. POLYACANTHUS SIGNATUS. (Plate LXXVII. fig. 5.)

Polyacanthus signatus Günth. Cat. Fish. iii. p. 379 (1861); Day, Fish. Ind. p. 371 (1878).

Præorbital serrated; maxillary extending to the vertical from the anterior margin of eye; interorbital width $\frac{1}{4}$ or a little more than $\frac{1}{4}$ the length of head. Dorsal XVI-XVIII 7-10. Anal XIV-XVII 9-12. 29 to 32 scales in a longitudinal series. Olivaceous; usually a dark spot at the base of the soft dorsal fin.

Hab. Ceylon.

Twelve specimens, measuring up to 130 mm. in total length, including the types of the species.

3. HELOSTOMA.

Helostoma Cuv. & Val. Hist. Nat. Poiss. vii. p. 341 (1831); Canestr. Verh. Zool.-Bot. Gesellsch. x. 1860, p. 705; Günth. Cat. Fish. iii. p. 377 (1861); Bleek. Verh. Ak. Amst. xix. 1879, p. 14.

Body rather deep, compressed. Lips thick, with small movable teeth; palate toothless. Præorbital serrated; præoperculum entire. Dorsal with XII-XVIII 13-16 rays; origin in advance of that of the anal, which has VIII-XV 17-19 rays; soft dorsal and anal scaly at the base and with the rays branched. Pelvics inserted below the pectorals, of a spine and 5 branched rays, the first of which is bifid and somewhat produced. Scales of moderate size, regularly arranged; lateral line interrupted below the soft dorsal, commencing again lower down.

One species from Siam, the Malay Peninsula and Archipelago.

1. HELOSTOMA TEMMINCKII.

Helostoma temminckii Cuv. & Val. Hist. Nat. Poiss. vii. p. 342, pl. cxciv. (1831); Günth. Cat. Fish. iii. p. 377 (1861); Bleek. Atl. Ichth. pl. cccxcvi. fig. 5 (1878) and Verh. Ak. Amst. xix. 1879, p. 15.

Depth of body $\frac{1}{2}$ or a little more than $\frac{1}{2}$ the length. Dorsal XVI-XVIII 13-16. Anal XIII-XV 17-19. 43 to 48 scales in a longitudinal series. Dark longitudinal stripes along the series of scales.

Hab. Siam; Malay Peninsula; Java, Sumatra, and Borneo

Five specimens, measuring up to 200 mm. in total length.

A specimen from Java with XII 14 dorsal and VIII 17 anal rays received the name *H. oligacanthum*, but was afterwards regarded by Dr. Bleeker as merely an abnormal example (Verh. Ak. Amst. xix. 1879, p. 16).

4. OSPHROMENUS.

Osphromenus Lacep. Hist. Nat. Poiss. iii. p. 117 (1802); Cuv. & Val. Hist. Nat. Poiss. vii. p. 377 (1831); Canestr. Verh. Zool.-Bot. Gesellsch. x. 1860, p. 706; Bleek. Verh. Ak. Amst. xix. 1879, p. 17.

Osphromenus (part.) Günth. Cat. Fish. iii. p. 382.

Body deep, compressed. Jaws with fixed conical teeth; palate toothless. Præorbital, præoperculum, and interoperculum serrated. Dorsal with XI-XIII 11-13 rays; origin above that of the anal, which has IX-XII 16-22 rays; anal scaly at the base and with most of the rays branched. Pelvics inserted below the pectorals, of a spine and 5 soft rays; first soft ray produced into a filament. Scales large, regularly arranged; lateral line complete, continuous.

A single species from the Malay Archipelago.

1. *OSPHROMENUS GOURAMI*.

Osphromenus gourami Lacep. Hist. Nat. Poiss. iii. p. 117, pl. iii. fig. 2 (1802); Cuv. & Val. Hist. Nat. Poiss. vii. p. 377, pl. excviii. (1831).

Osphromenus olfae Cuv. Règne Anim. ii. p. 336 (1817); Cuv. & Val. l. c.; Günth. Cat. Fish. iii. p. 382 (1861); Day, Fish. Ind. p. 372, pl. lxxix. fig. 6 (1878); Bleek. Atl. Ichth. pls. ccxcv. fig. 6 and ccxcvi. fig. 6 (1878); and Verh. Ak. Amst. xix. 1879, p. 17.

Osphromenus notatus Cuv. & Val. t. c. p. 386.

Body deep, compressed. Dorsal XI-XIII 11-13. Anal IX-XII 16-22. 30 to 35 scales in a longitudinal series. Adult uniformly olivaceous; young with oblique darker cross-bands, a blackish spot at the base of the pectoral and another above the posterior part of the anal.

Hab. Java, Sumatra, and Borneo; introduced into various tropical countries.

Numerous examples measuring up to 450 mm. in total length, from Borneo (*Hose, Cator*) and Sumatra (*Moesch*), and also from Penang (*Cantor*), Madras, Mauritius, and the Seychelles.

The species attains a large size and a weight of more than 20 lbs.; it is an excellent food-fish.

5. *MACROFODUS*.

Macropodus Lacep. Hist. Nat. Poiss. iii. p. 417 (1802).

Pseudosphromenus Bleek. Verh. Ak. Amst. xix. 1879, p. 17.

Body oblong, compressed. Jaws with fixed conical teeth; palate toothless. Praeorbital and præoperculum serrated. Dorsal with XIII-XVII 5-8 rays; origin nearly above that of the anal, which has XVI-XX. 9-15 rays; a scaly sheath at the base of dorsal and anal fins; rays branched. Pelvic fins inserted below the pectorals, of a spine and 5 soft rays; first soft ray produced into a filament. Scales large, regularly arranged; lateral line vestigial or absent.

Two species from China, India, and the Malay Peninsula.

1. *MACROPODUS OPERCULARIS*.

Labrus opercularis Linn. Amœn. Acad. iv. p. 248 (1788).

Chatodon chinensis Bloch, Ansl. Fisch. pl. ccxviii. fig. 1 (1790).

Macropodus viridiauratus Lacep. Hist. Nat. Poiss. iii. p. 417, pl. xvi. fig. 1 (1802); Cuv. & Val. Hist. Nat. Poiss. vii. p. 373 (1831); Günth. Cat. Fish. iii. p. 382 (1861).

Polyacanthus chinensis Cuv. & Val. t. c. p. 357; Richards. Ichth. China, p. 250 (1846).

Macropodus venustus Cuv. & Val. t. c. p. 375, pl. excviii.

Macropodus ocellatus Cant. Ann. Mag. N. H. ix. 1842, p. 484.

Polyacanthus opercularis Richards. l. c.; Günth. t. c. p. 379.

Polyacanthus paludosus Richards. l. c.

Depth of body $\frac{1}{3}$ or more than $\frac{1}{3}$ of the length. Dorsal XIII-XVII 6-8. Anal XVII-XX 11-15. Small scales on the fins in addition to the basal sheath; soft vertical fins sometimes produced, when the caudal becomes bilobed. 28 to 31 scales in a longitudinal series. A round black spot on the extremity of the operculum; body with or without dark cross-bars, sometimes with irregular silvery bars.

Hab. China; Cochin China; Formosa; Loo Choo Islands.

Several specimens, measuring up to 80 mm. in total length, including the types of *M. ocellatus*.

2. MACROPODUS CUPANUS.

Polyacanthus cupanus Cuv. & Val. Hist. Nat. Poiss. vii. p. 357 (1831); Günth. Cat. Fish. iii. p. 381 (1861); Day, Fish. Ind. p. 371, pl. lxxviii. fig. 4 (1878).

Depth of body about $\frac{1}{3}$ the length. Dorsal XIV-XVII 5-7. Anal XVI-XIX 9-11. Fins scaleless except for the basal sheath; soft vertical fins sometimes produced, when the caudal becomes pointed. 29 to 32 scales in a longitudinal series. A dark spot on each side at the base of the caudal fin; body sometimes with two dark longitudinal bands, rarely with irregular cross-bars.

Hab. India; Ceylon; Malay Peninsula; in lowland streams and estuaries.

Eighteen specimens, measuring up to 45 mm. in total length.

6. PAROSPROMENUS.

Parosphromenus Bleek. Verh. Ak. Amst. xix. 1879, p. 19.

Body rather elongate, compressed. Jaws with fixed conical teeth; palate toothless. Præorbital and opercular bones, except the præoperculum, not serrated. Dorsal with XIII 7 rays; origin in advance of that of the anal, which has XIII 9 rays; dorsal and anal fins scaleless and with simple rays. Pelvics inserted below the pectorals, of a spine and 5 soft rays; first soft ray produced into a filament. Scales large, regularly arranged; lateral line vestigial or absent.

A single species, from Sumatra.

1. PAROSPROMENUS DEISSNERI.

Osphromenus deissneri Bleek. Nat. Tijdschr. Ned. Ind. xviii. 1859, p. 376.

Polyacanthus deissneri Günth. Cat. Fish. iii. p. 381 (1861).

Parosphromenus deissneri Bleek. Atl. Ichth. pl. cccxcv. fig. 1 (1878), and Verh. Ak. Amst. xix. 1879, p. 20.

Depth of body $3\frac{2}{3}$ in the length. Dorsal XIII 7. Anal XIII 9. 30 scales in a longitudinal series. Body with blackish longitudinal stripes, a mid-dorsal and a mid-ventral and two broader ones on each side.

Hab. Bangka, Sumatra.

Total length 34 mm.

7. SPHÆRICHTHYS.

Spharichthys Canestrini, Verh. Zool.-Bot. Gesellsch. x. 1860, p. 707.

Body deep, compressed. Jaws with very small, fixed teeth; palate toothless. Præorbital and lower limb of præoperculum serrated. Dorsal with VIII-XII 7-10 rays; origin a little behind that of the anal, which has VIII-X 18-22 rays; anal scaly at the base and with the rays simple. Pelvics inserted a little in advance of the pectorals, each of a spine and 5 soft rays, the first somewhat produced; scales large, regularly arranged; lateral line vestigial or absent.

A single species from the Malay Peninsula.

1. SPHÆRICHTHYS OSPHROMENOIDES.

Sphærichthys osphromenoides Canestrini, Verh. Zool.-Bot. Gesellsch. x. 1860, p. 707.

Osphromenus malayanus Duncker, Monatsb. Mus. Hamburg, xxi. 1904, p. 163, pl. i. fig. 8.

Body deep, compressed. Dorsal VIII-XII 7-10. Anal VIII-X 18-22. 26 to 29 scales in a longitudinal series. Brownish; four whitish nearly vertical stripes on the posterior part of the fish, of which one connecting the posterior dorsal and anal spines and a second running downwards from the end of the dorsal fin are the most conspicuous, the third and fourth bordering a dark spot on the upper part of the base of the caudal; sometimes a similar stripe on the head, running obliquely from the temporal region to the base of the pelvic fins.

Hab. Malay Peninsula.

Two specimens, types of *O. malayanus*, 40 mm. in total length, from Kuala Lumpur (*Robinson*).

8. CTENOPS.

Ctenops McClelland, Calc. Journ. Nat. Hist. v. 1844, p. 281.

Trichopsis (Kner) Canestr. Verh. Zool.-Bot. Gesellsch. x. 1860, p. 708.

Body oblong, compressed. Jaws with fixed conical teeth. Præorbital and præoperculum serrated. Dorsal with II-VII 6-8 rays, commencing above the anal, which has IV-VIII 24-28 rays; anal scaly at the base, with simple rays. Pelvics inserted a little in advance of the pectorals, each of a spine and five soft rays, the first produced into a filament. Scales large, regularly arranged; lateral line vestigial or absent.

Two species from India, Cochin China, Siam, and the Malay Archipelago.

1. CTENOPS VITTATUS.

Osphromenus vittatus Cuv. & Val. Hist. Nat. Poiss. vii. p. 387 (1831).

Trichopsis striatus Bleek. Verh. Batav. Genootsch. xxiii. 1850, no. 8, p. 11.

Osphromenus striatus Günth. Cat. Fish. iii. p. 386 (1861).

Ctenops striatus Bleek. Atl. Ichth. pl. cccxvi. (1878), and Verh. Ak. Amst. xix. 1879, p. 24.

Depth of body $2\frac{1}{2}$ to 3 in the length. Snout shorter than eye. Dorsal II-IV 6-8. Anal VI-VII 24-28. 28 scales in a longitudinal series. Body with dark longitudinal stripes, on each side two from the eye to the caudal fin, the upper bearing a humeral spot; usually two more stripes on each side, one above ending just behind the dorsal fin, the other from the chin through the base of the pectoral to the end of the anal.

Hab. Cochín China, Siam, Java, Sumatra, and Borneo. Seven specimens, measuring up to 60 mm. in total length, from Cochín China (*Paris Mus.*), Siam (*Mouhot*), and Java.

2. CTENOPS NOBILIS.

Ctenops nobilis McClell. Calc. Journ. Nat. Hist. v. 1844, p. 281, pl. xxi. fig. 1.

Osphromenus nobilis Day, Fish. Ind. p. 372, pl. lxxviii. fig. 5 (1878).

Depth of body $2\frac{1}{2}$ to 3 in the length. Snout longer than eye. Dorsal V-VII 7-8. Anal IV-V 24-28. 29 to 33 scales in a longitudinal series. Brownish, with darker stripes along the series of scales and with scattered blackish spots; a silvery white stripe, more or less interrupted, from eye to base of caudal; below it two similar stripes or series of oblong spots; fins with small dark spots; an ocellus on the upper part of the base of the caudal.

Hab. North-eastern Bengal and Assam.

Eight specimens, measuring up to 75 mm. in total length, from N.E. Bengal (*Jerdon*).

9. BETTA.

Betta Bleek. Verh. Batav. Genootsch. xxiii. 1850, no. 8, p. 12, and Verh. Ak. Amst. xix. 1879, p. 26; Günth. Cat. Fish. iii. p. 388 (1861).

Paraphiocephalus Popta, Notes Leyden Mus. xxv. 1905, p. 184, and xxvii. 1906, p. 9.

Body moderately elongate, more or less compressed. Jaws with fixed conical teeth; palate toothless. Præorbital and opercular bones entire. Dorsal without or with a single spine and with 7 to 11 soft rays; origin above the anal; anal without or with 1 to 4 spines and with 20 to 37 soft rays; pelvics inserted below or a little in advance of the pectorals, of a spine and 5 soft rays, the outermost of which is more or less produced. Scales large, regularly arranged; lateral line vestigial or absent.

Fourteen species from Siam, the Malay Peninsula and Archipelago.

Micracanthus Sauvage, from the Ogowe, with III 7 dorsal and IV 23 anal rays, appears to be closely allied to *Ctenops* and *Betta*, but differs in having only 4 soft rays in the pelvic fin.

Synopsis of the Species.

- I. All the rays of the dorsal and anal fins articulated (*Parophiocephalus*).
 - a. Anal with 26 to 30 rays.

Maxillary extending beyond middle of eye	1. <i>macrostoma</i> .
Maxillary not extending beyond anterior edge of eye	2. <i>unimaculata</i> .
 - b. Anal with 34 to 37 rays
- II. Anal fin with one to four spines (*Betta*).
 - A. All the rays of the dorsal fin flexible, articulated; maxillary extending to below nostrils or anterior edge of eye.
 1. Anal with I 27 rays
 2. Anal with II 25-29 rays.
 - Length of head 3 to $3\frac{1}{4}$ (adult) in the length of the fish
 - Length of head $3\frac{1}{4}$ (young) to $3\frac{3}{4}$ (adult) in the length of the fish
 3. Anal with II 21-24 rays
 - B. First dorsal ray a more or less pungent spine.
 1. Maxillary extending to below anterior part of eye
 2. Maxillary extending to below posterior nostril or anterior edge of eye.
 - Anal with I 20 rays; 26 scales in a longitudinal series; diameter of eye 4 in the length of head (in a specimen of 42 mm.)
 - Anal with I 23 rays; 28 scales in a longitudinal series; diameter of eye 3 in the length of head (in a specimen of 50 mm.)
 - Anal with II 20-22 rays; 28 or 29 scales in a longitudinal series; diameter of eye $3\frac{1}{4}$ to $3\frac{1}{2}$ in the length of head (in specimens of 50 to 60 mm.)
 - Anal with III 21 rays; 30 scales in a longitudinal series; diameter of eye $3\frac{3}{8}$ in the length of head (in a specimen of 47 mm.)
 3. Maxillary extending to the vertical from between the nostrils.
 - Anal with II-IV 22-24 rays
 - Anal with II 30 rays

1. *BETTA MACROSTOMA*, sp. n. (Plate LXXVIII. fig. 3.)

Depth of body 4 in the length, length of head 3. Snout slightly longer than eye, the diameter of which is $4\frac{1}{3}$ in the length of head; interorbital width $2\frac{4}{5}$ in the length of head. Maxillary extending a little beyond the middle of eye. Dorsal 11. Anal 26. 32 scales in a longitudinal series. Two blackish longitudinal bands from eye to caudal fin; dorsal with series of dark spots and with a large black ocellus near the base posteriorly; caudal with two blackish cross-bars; other fins dusky.

Hab. Sarawak.

A single specimen, 80 mm. in total length, collected by Dr. C. Hose.

2. BETTA UNIMACULATA.

Parophiocephalus unimaculatus Popta, Notes Leyden Mus. xxv. 1905, p. 184, and xxvii. 1906, p. 10, pl. i. fig. 1.

Depth of body 4 in the length, length of head $3\frac{1}{3}$. Snout as long as eye, the diameter of which is $4\frac{1}{4}$ in the length of head; interorbital width $2\frac{2}{3}$ in the length of head. Maxillary extending to below posterior nostril or anterior edge of eye. Dorsal 9. Anal 30. 33 scales in a longitudinal series. Olivaceous; a blackish spot at the base of the caudal fin; fins dusky, the dorsal and caudal with series of small blackish spots.

Hab. Borneo.

A single specimen, 70 mm. in total length, from the River Bongon, N. Borneo, collected by Mr. A. Everett.

Popta's description is based on numerous specimens from the Howong and Kajan Rivers, 38 to 82 mm. in total length. She gives the following numbers:—Dorsal 7–8. Anal 27–30. 32 scales in a longitudinal series.

3. BETTA BELLICA.

Betta bellica Sauvage, Bull. Soc. Zool. France, ix. 1884, p. 217, fig.

Depth of body 4 in the length, length of head about $4\frac{2}{3}$. Dorsal 10. Anal 37 (34 according to the figure). 35 scales in a longitudinal series. Anterior half of each scale emerald-green, the rest bronze; fins dusky.

Hab. Perak.

Total length, 90 mm.

4. BETTA AKARENSIS, sp. n. (Plate LXXVII. fig. 3.)

Depth of body $3\frac{1}{2}$ in the length, length of head 3. Snout shorter than eye, the diameter of which is $3\frac{1}{3}$ in the length of head and nearly equal to the interorbital width. Maxillary extending to below the posterior nostril. Dorsal 8. Anal I 27. 31 scales in a longitudinal series. Brownish, with darker stripes along the series of scales; a dark longitudinal band on the head, passing through the eye; fins dusky.

Hab. River Akar, Sarawak.

A single specimen, 52 mm. in total length, collected by Dr. C. Hose.

5. BETTA PUGNAX.

Macropodus pugnax Cantor, Cat. Malay Fish. p. 84, pl. ii. figs. 1–3 (1850).

Betta pugnax Günth. Cat. Fish. iii. p. 389 (1861).

Depth of body $3\frac{1}{4}$ in the length, length of head 3 to $3\frac{1}{4}$. Snout shorter than eye, the diameter of which is $3\frac{3}{5}$ in the length of head; interorbital width $2\frac{1}{5}$ in the length of head. Maxillary extending to below posterior nostril or anterior edge of eye.

Dorsal 9-10; origin equidistant from head and base of caudal. Anal II 26. 30 to 32 scales in a longitudinal series. Olivaceous, with darker cross-bands; each scale on the side with a silvery dot; a blackish longitudinal stripe on the head, passing through the eye; fins, except the pectoral, pale reddish; margin of dorsal and anal, and pelvic filament greenish or golden.

Hab. Pinang.

Three specimens, including two skins, types of the species, 75 to 90 mm. in total length, from Dr. Cantor's collection.

6. *BETTA ANABATOIDES*. (Plate LXXVIII. fig. 4.)

Betta anabatoides Bleek. Nat. Tijdschr. Ned. Ind. i. 1850, p. 269.

Depth of body 3 to $3\frac{3}{5}$ in the length, length of head $3\frac{1}{4}$ to $3\frac{3}{4}$. Snout as long as or shorter than eye, the diameter of which is $3\frac{1}{4}$ to $4\frac{1}{2}$ in the length of head; interorbital width $2\frac{1}{5}$ to $2\frac{4}{5}$ in the length of head. Maxillary extending to below posterior nostril or anterior edge of eye. Dorsal 8-10; origin a little nearer to caudal fin than to head (in the adult). Anal II 25-29. 31 to 33 scales in a longitudinal series. Brownish; usually a dark stripe on the head passing through the eye, sometimes continued on the body and with another above it; fins dusky, the dorsal and caudal usually with series of dark spots.

Hab. Borneo.

Twenty specimens from Sarawak (*Cutter, Doria, Hose, Everett*), 55 to 120 mm. in total length, seem to belong to the species described by Bleeker from Bandjermassing, S.E. Borneo.

7. *BETTA FUSCA*, sp. n. (Plate LXXVIII. fig. 2.)

Depth of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the length, length of head $3\frac{1}{3}$. Snout shorter than eye, the diameter of which is $3\frac{1}{4}$ to $3\frac{1}{2}$ in the length of head; interorbital width $2\frac{1}{4}$ to $2\frac{1}{2}$ in the length of head. Maxillary nearly or quite extending to below the posterior nostril. Dorsal 9. Anal II 21-24. 31 or 32 scales in a longitudinal series. A dark longitudinal band through the eye; scales with dark edges; fins dusky.

Hab. Sumatra.

Two specimens, 82 mm. in total length, collected by Mr. W. Morton.

8. *BETTA BLEEKERI*, sp. n.

Betta picta (non Val.) Bleek. Atlas Ichth. ix. pl. cccxv. fig. 3 (1877), and Verh. Ak. Amst. xix. 1879, p. 26.

Maxillary extending well beyond the vertical from anterior edge of eye. Dorsal I 9. Anal II 27. 34 scales in a longitudinal series. Olivaceous; dorsal with longitudinal stripes.

Bleeker's description is evidently chiefly based on specimens of the species figured in the Atlas.

9. *BETTA TRIFASCIATA*.

? *Panchax pictum* Cuv. & Val. Hist. Nat. Poiss. xviii. p. 385 (1846).

Betta trifasciata Bleek. Verhandl. Batav. Genootsch. xxiii. 1850, no. 8, p. 12; Günth. Cat. Fish. iii. p. 388 (1861).

Snout short; mouth small; diameter of eye 4 in head. Dorsal I 7. Anal I 20. 26 scales in a longitudinal series. Three black stripes from operculum to caudal fin.

Hab. Ambarawa, Central Java, 1500 ft.

Total length, 42 mm.

10. *BETTA MACROPHALMA*, sp. n. (Plate LXXVII. fig. 2.)

Depth of body $3\frac{1}{2}$ in the length, length of head 3. Snout shorter than eye, the diameter of which is 3 in the length of head and nearly equal to the interorbital width. Maxillary extending to below posterior nostril. Dorsal I 8. Anal I 23. 28 scales in a longitudinal series. Traces of dark longitudinal stripes on the body.

Hab. Singapore.

A single specimen, 50 mm. in total length, from Prof. Peters's collection.

11. *BETTA TÆNIATA*, sp. n. (Plate LXXVIII. fig. 1.)

Depth of body $3\frac{1}{3}$ to $3\frac{2}{3}$ in the length, length of head 3. Snout shorter than eye, the diameter of which is $3\frac{1}{4}$ to $3\frac{1}{2}$ in the length of head; interorbital width 3 to $3\frac{1}{4}$ in the length of head. Maxillary extending to below posterior nostril. Dorsal I 8. Anal II 20–22. 28 or 29 scales in a longitudinal series. Brownish; 2 or 3 blackish longitudinal bands on the side; fins dusky.

Hab. River Senah, Sarawak.

Four specimens, 50 to 60 mm. in total length, collected by Mr. A. Everett.

12. *BETTA RUBRA*. (Plate LXXVII. fig. 1.)

Betta rubra Perugia, Ann. Mus. Genova (2) xiii. 1893, p. 242.

Depth of body $3\frac{3}{4}$ in the length, length of head $3\frac{1}{4}$. Snout shorter than eye, the diameter of which is $3\frac{2}{3}$ in the length of head; interorbital width $3\frac{1}{3}$ in the length of head. Maxillary extending to below the posterior nostril. Dorsal I 7. Anal III 21. 30 scales in a longitudinal series. Upper half of the body dark brownish; five or six dark vertical bars of the same colour descending on to the pale ground colour of the lower part of the side; vertical and pelvic fins reddish.

Hab. Lake Toba, Sumatra.

A single specimen, one of the types of the species, 47 mm. in total length.

13. *BETTA SPLENDENS*, sp. n.

Betta pugnax, var., Cantor, Cat. Malay Fish. p. 86, pl. ii. fig. 4 (1850).

Betta pugnax Waite, Rec. Austral. Mus. v. 1904, p. 293, pl. xxxviii.

Depth of body $2\frac{5}{8}$ to $3\frac{2}{3}$ in the length, length of head $3\frac{1}{4}$ to $3\frac{3}{5}$. Snout as long as or shorter than eye, the diameter of which is $3\frac{1}{5}$ to 4 in the length of head; interorbital width $2\frac{2}{5}$ to 3 in the length of head. Maxillary extending to the vertical from between the nostrils. Dorsal I 8-9. Anal II-IV 21-24. 30 to 32 scales in a longitudinal series. Dark greenish olive above, red below; all the scales edged with black; a dark oblique stripe from eye to suboperculum; sometimes two dark longitudinal bands, with a pale band between them, from eye to caudal fin; gill-membranes blackish; dorsal rays black, membrane greenish with black undulating stripes; caudal rays red, membrane greenish; pelvics and anal red, with dark edges; pectoral pale.

Hab. Siam; Malay Peninsula.

Nine specimens, 35 to 55 mm. in total length, from Bangkok, the Menam River, and Pinang, collected by Captain S. S. Flower.

14. *BETTA FASCIATA*, sp. n. (Plate LXXVII. fig. 4.)

Depth of body $3\frac{1}{2}$ to 4 in the length, length of head $3\frac{2}{3}$ to $4\frac{2}{5}$. Snout shorter than eye, the diameter of which is 3 to $3\frac{1}{2}$ in the length of head; interorbital width $2\frac{2}{3}$ to 3 in the length of head. Maxillary extending to the vertical from between the nostrils. Dorsal I 9-10. Anal II 30. 34 to 36 scales in a longitudinal series. Brownish, with several somewhat oblique darker cross-bars; fins dusky, the dorsal with series of small dark spots, the pelvics and anal blackish.

Hab. Deli, Sumatra.

Two specimens, 65 and 90 mm. in total length, collected by Mr. Iversen.

10. *TRICHOPODUS*.

Trichopodus Lacep. Hist. Nat. Poiss. iii. p. 129 (1802); Canestrini, Verh. Zool.-Bot. Gesellsch. x. 1860, p. 708; Bleek. Verh. Ak. Amst. xix. 1879, p. 21.

Trichopus Cuv. & Val. Hist. Nat. Poiss. vii. p. 388 (1831).

Osphromenus (part.) Günth. Cat. Fish. iii. p. 382 (1861).

Body deep or moderately elongate, compressed. Jaws with fixed conical teeth; palate toothless. Præorbital, præ-, sub- and inter-operculum serrated. Dorsal with III-VIII 8-11 rays; origin above the anal, which has IX-XIV 25-39 rays; anal covered with scales except near the edge and with most of the rays simple; pelvics inserted a little in advance of the pectorals, with a vestigial spine adnate to the long simple ray, which has

2 or 3 small rays in its axil. Scales of moderate size, irregularly arranged; lateral line complete, but not continuous.

Four species from Cochin China, Siam, the Malay Peninsula and Archipelago.

Synopsis of the Species.

Dorsal with V-VII 8-10 rays, anal with XII-XIV 25-30; 30 to 36 scales in the lateral line and 44 to 50 in a longitudinal series above the lateral line	1. <i>leeri</i> .
Dorsal with VI-VIII 8-9 rays, anal with X-XII 33-37; 30 to 40 scales in the lateral line and 40 to 52 in a longitudinal series above the lateral line	2. <i>trichopterus</i> .
Dorsal with VII 10-11 rays, anal with IX-XI 36-38; 42 to 47 scales in the lateral line and 55 to 63 in a longitudinal series above the lateral line	3. <i>pectoralis</i> .
Dorsal with III-IV 8-10 rays, anal with X-XII 34-39; 35 to 42 scales in the lateral line and 48 to 65 in a longitudinal series above the lateral line	4. <i>microlepis</i> .

1. TRICHOPODUS LEERI. (Plate LXXIX. fig. 2.)

Trichopus trichopterus (part.) Cantor, Cat. Malay. Fish. p. 89 (1850).

Trichopus leerii Bleek. Nat. Tijdschr. Ned. Ind. iii. 1852, p. 577.

Ophromenus trichopterus var. *leerii* Günth. Cat. Fish. iii. p. 384 (1861).

Trichopodus trichopterus (part.) Bleek. Verh. Akad. Amst. xix. 1879, p. 21.

Depth of body $2\frac{1}{4}$ to $2\frac{3}{5}$ in the length. Diameter of eye $1\frac{3}{5}$ in the length of postorbital part of head (in adult specimens of 100 to 110 mm.). Dorsal V-VII 8-10. Anal XII-XIV 25-30. Pectoral as long as the head. 30 to 36 scales in the lateral line, 44 to 50 in a longitudinal series above the lateral line. Body and vertical fins with pale greenish spots enclosed in a reddish-brown network; a dark longitudinal stripe from the snout through the eye, ending in a spot at the base of the caudal fin.

Hab. Malay Peninsula; Sumatra.

Eight specimens, measuring up to 110 mm. in total length, from Pinang (*Cantor*) and Sumatra (*Moesch, Merrem*).

2. TRICHOPODUS TRICHOPTERUS.

Labrus trichopterus Pall. Spicil. viii. p. 45 (1777); Gmelin, Linn. Syst. Nat. p. 1286 (1789); Bloch, Ausl. Fische, pl. ccxcv. fig. 2 (1792).

Trichopodus trichopterus Lacep. Hist. Nat. Poiss. iii. p. 129 (1802); Bleek. Atlas Ichth. ix. pl. ccxcv. fig. 4 (1878).

Trichopus trichopterus Cuv. & Val. Hist. Nat. Poiss. vii. p. 388, pl. cxcix. (1831).

Trichopus trichopterus (part.) Cantor, Cat. Malay Fish. p. 89 (1850).

Osphromenus trichopterus vars. *koelreuteri* and *cantoris* Günth. Cat. Fish. iii. p. 384 (1861).

Osphromenus siamensis Günth. t. c. p. 385.

Trichopodus trichopterus (part.) Bleek. Verh. Akad. Amst. xix. 1879, p. 21.

Depth of body 2 to $2\frac{3}{5}$ in the length. Diameter of eye 2 in the length of the postorbital part of head (in adult specimens of 100 to 120 mm.). Dorsal VI-VIII 8-9. Anal X-XII 33-37. Pectoral as long as the head. 30 to 40 scales in the lateral line and 40 to 52 in a longitudinal series above the lateral line. Head and body with or without somewhat oblique dark brown cross-bands, which may be broken up into spots; a round black spot on the middle of the side and another at the base of the caudal fin; sometimes a blackish lateral band through the spots, from eye to caudal fin; dorsal, caudal, and posterior part of anal with alternate series of pale and dark spots, the latter sometimes forming reticulations.

Hab. Cochin China; Siam; Malay Peninsula and Archipelago.

Here described from numerous specimens, measuring up to 120 mm. in total length, from Cochin China (*Paris Mus.*), Siam (*Mouhot*, *Day*, *Flower*, *Siamese Mus.*), Pinang (*Cantor*), Sumatra (*Moesch*) and Java.

3. TRICHOPODUS PECTORALIS, sp. n. (Plate LXXIX. fig. 1.)

Depth of body $2\frac{1}{5}$ to 3 in the length. Diameter of eye a little less than $\frac{1}{2}$ the length of the postorbital part of the head. Dorsal VII 10-11. Anal IX-XI 36-38. Pectoral longer than the head. 42 to 47 scales in the lateral line and 55 to 63 in a longitudinal series above the lateral line. Head and body with oblique dark cross-bands; an interrupted lateral band from eye to caudal fin, sometimes present on the head only; fins without spots, or a few pale spots on the basal part of the caudal.

Hab. Siam; Malay Peninsula.

Six specimens, 140 to 160 mm. in total length, from Siam (*Jamrach*, *Siamese Mus.*) and Singapore (*Vipan*).

4. TRICHOPODUS MICROLEPIS.

Osphromenus microlepis Günth. Cat. Fish. iii. p. 385 (1861).

Trichopus parvipinnis Sauv. Nouv. Arch. Mus. (2) iv. 1881, p. 165, pl. vi. fig. 3.

Depth of body 2 in the length. Diameter of eye 2 in the length of postorbital part of head (in adult specimens of 150 mm.). Dorsal III-IV 8-10. Anal X-XII 34-39. Pectoral longer than the head. 35 to 42 scales in the lateral line and 58 to 65 in a longitudinal series above the lateral line. Silvery; back greenish; dorsal and caudal fins with little blackish spots.

Hab. Siam and Camboja.

Three specimens, 90 to 150 mm. in total length, including the

types of the species and of *T. parvipinnis*, from Bangkok (*Paris Mus.*), the Menam River (*Siamese Mus.*), and Cambojia (*Mouhot*).

11. TRICHOGASTER.

Trichogaster Schneid. Bloch's Syst. Ichth. p. 164 (1801); Günth. Cat. Fish. iii. p. 387 (1861).

Colisa Cuv. & Val. Hist. Nat. Poiss. vii. p. 359 (1831); Canestr. Verh. Zool.-Bot. Gesellsch. x. 1860, p. 705.

Body oblong, compressed. Jaws with fixed conical teeth; palate toothless. Præorbital and præoperculum serrated. Dorsal with XV-XIX 6-14 rays; origin above or a little in advance of that of the anal, which has XIV-XXII 11-20 rays; anal scaly at the base and with the soft rays branched. Pelvics inserted in advance of the pectoral, reduced to a single filamentous ray. Scales large, regularly arranged. Lateral line sometimes absent or vestigial, usually present and comprising an upper anterior and a lower posterior portion, which may be connected by 1 to 4 pierced scales of the intermediate series.

Five species from India and Burmah.

Synopsis of the Species.

I. Anal fin more or less scaly, the scales not covering the fin to the tips of the spines.

Dorsal XV-XVII 9-14. Anal XV-XVIII 14-19. 29 to 31 scales in a longitudinal series	1. <i>fasciatus</i> .
Dorsal XVII-XVIII 7-9. Anal XVII-XX 11-13. 27 to 29 scales in a longitudinal series	2. <i>sota</i> .

II. Anal fin densely scaly, the scales covering the fin to the tips of the posterior spines.

Dorsal XV-XVIII 8-10. Anal XVI-XVIII 17-20. 29 to 31 scales in a longitudinal series	3. <i>labiosus</i> .
Dorsal XV-XVII 7-10. Anal XVII-XVIII 13-17. 27 or 28 scales in a longitudinal series	4. <i>lalius</i> .
Dorsal XVII-XIX 6-7. Anal XXI-XXII 13. 28 or 29 scales in a longitudinal series	5. <i>chuna</i> .

1. TRICHOGASTER FASCIATUS.

Trichogaster fasciatus Schneid. Bloch's Syst. Ichth. p. 164, pl. xxxvi. (1801); Günth. Cat. Fish. iii. p. 387 (1861); Day, Fish. India, p. 374, pl. lxxviii. fig. 6 (1878).

Trichopodus colisa Buch. Ham. Fish. Ganges, pp. 117, 372, pl. xv. fig. 40 (1822).

Trichopodus bejeus Buch. Ham. t. c. pp. 118, 372.

Trichopodus cotra Buch. Ham. t. c. pp. 119, 372.

Colisa vulgaris Cuv. & Val. Hist. Nat. Poiss. vii. p. 362 (1831).

Colisa bejeus Cuv. & Val. t. c. p. 365.

Colisa cotra Cuv. & Val. t. c. p. 366.

Polyacanthus fasciatus Cuv. & Val. t. c. p. 369.

Colisa ponticeriana Cuv. & Val. t. c. p. 370.

29 to 31 scales in a longitudinal series. Dorsal XV–XVII 9–14. Anal XV–XVIII 14–19, scaly at the base. Greenish, with orange or bluish bars descending obliquely downwards and backwards from the back to the anal fin; vertical fins with alternate dark and pale spots or bars; anal often with a red margin.

Hab. Northern India, Assam, and Upper Burma.

Numerous specimens, measuring up to 100 mm. in total length.

2. TRICHOGASTER SOTA. (Plate LXXIX. fig. 3.)

Trichopodus sota Buch. Ham. Fish. Ganges, p. 120 (1822).

Colisa sota Cuv. & Val. Hist. Nat. Poiss. vii. p. 367 (1831).

27 to 29 scales in a longitudinal series. Dorsal XVII–XVIII 7–9. Anal XVIII–XX 11–13, scaly at the base. Brownish, sometimes with darker stripes along the series of scales; fins immaculate.

Hab. Ganges.

Nine specimens, measuring up to 45 mm. in total length, from Debroo (*Day*).

3. TRICHOGASTER LABIOSUS.

Trichogaster labiosus Day, Fish. Ind. p. 374, pl. lxxix. fig. 4 (1878).

29 to 31 scales in a longitudinal series. Dorsal XV–XVIII 8–10. Anal XVI–XVIII 17–20, densely scaly, the scales covering the fin to the tips of the posterior spines. Greenish, with some darker somewhat oblique cross-bars on the side; fins immaculate.

Hab. Burma, Shan States, and Tenasserim.

Several specimens, measuring up to 90 mm. in total length, from Burma (*Day*), Sittang River (*Oates*) and Tenasserim (*Wood-Mason*).

The thick papillose lips from which the species takes its name occur only in the males; in *T. fasciatus* also the males may have the lips more or less swollen and papillose.

4. TRICHOGASTER LALIUS.

Trichopodus lalius Ham. Buch. Fish. Ganges, pp. 120, 372 (1822).

Colisa lalius Cuv. & Val. Hist. Nat. Poiss. vii. p. 366 (1831).

? *Colisa unicolor* Cuv. & Val. t. c. p. 368.

? *Trichogaster unicolor* Günth. Cat. Fish. iii. p. 388 (1861).

Trichogaster lalius Day, Fish. Ind. p. 375, pl. lxxix. fig. 5 (1878).

27 or 28 scales in a longitudinal series. Dorsal XV–XVII

7-10. Anal XVII-XVIII 13-17, densely scaly, the scales covering the fin to the tips of the posterior spines. Body scarlet, crossed by somewhat oblique bands of pale blue; fins with scarlet spots or bars; anal with a red margin.

Hab. Northern India and Assam.

Several specimens, measuring up to 50 mm. in total length, from India (*Waterhouse*), Calcutta (*Day*), and Cachar (*Playfair*).

Colisa unicolor was described from Calcutta as a uniformly coloured fish with XV 6 dorsal and XIV 12 anal rays. Day examined the types at Paris, and says they appear to belong to *T. lalius*.

5. TRICHOGASTER CHUNA.

Trichopodus chuna Ham. Buch. Fish. Ganges, pp. 121, 372 (1822).

Colisa chuna Cuv. & Val. Hist. Nat. Poiss. vii. p. 368 (1831).

Trichogaster chuna Day, Fish. Ind. p. 373, pl. lxxix. fig. 3 (1878).

28 or 29 scales in a longitudinal series. Dorsal XVIII-XIX 6-7. Anal XXI-XXII 13, densely scaly, the scales covering the fin to the tips of the posterior spines. Greenish; a blackish longitudinal band from the eye to the caudal fin.

Hab. N.E. India and Assam.

Two specimens, less than 40 mm. in total length, from Calcutta (*Day*) and from Jerdon's collection.

EXPLANATION OF THE PLATES.

PLATE LXXVII.

- Fig. 1. *Betta rubra*.
 2. " *macrophthalma*.
 3. " *akarensis*.
 4. " *fasciata*.
 5. *Polyacanthus signatus*.

PLATE LXXVIII.

- Fig. 1. *Betta taniata*.
 2. " *fusca*.
 3. " *macrostoma*.
 4. " *anabatoïdes*.

PLATE LXXIX.

- Fig. 1. *Trichopodus pectoralis*.
 2. " *leeri*.
 3. *Trichogaster sota*.